EOS Production Sites
Network Performance Report: May 2013

This is a monthly summary of EOS network performance testing between production sites -- comparing the measured performance against the requirements. Significant improvements are noted in Green, Network problems in Red, System problems and Requirements issues in Gold, Issues in Orange, and other comments in Blue.

Highlights:

- **Mostly stable flows**
  - **GPA ↑ 3.71** (was 3.58 last month).

- **Requirements**: from the Network Requirements Database

- **LaRC ASDC Outflow:** No change: very high congestion continued to reduce performance on most outflows. (Not observed from LaRC ANGe or LaRC-PTH)

- **2 flows below** Good :
  - **GSFC → EROS**: Adequate
  - **LaRC ASDC → JPL**: Almost Adequate

Ratings Changes:

Upgrades: ↑
  - **RSS → GHRC**: Adequate → Excellent
  - **GSFC NPP SD3E → Wisconsin**: Good → Excellent

Downgrades: ↓
  - **LaRC ASDC → JPL**: Adequate → Almost Adequate

Ratings Categories:

Rating	Value	Criteria
Excellent:	**4**	**Total Kbps** > Requirement * 3
Good:	**3**	1.3 * Requirement <= **Total Kbps** < Requirement * 3
Adequate:	**2**	Requirement < **Total Kbps** < Requirement * 1.3
Almost Adequate:	**1.5**	Requirement / 1.5 < **Total Kbps** < Requirement
Low:	**1**	Requirement / 3 < **Total Kbps** < Requirement / 1.5
Bad:	**0**	**Total Kbps** < Requirement / 3

Where Total Kbps = Average Integrated Kbps (where available), otherwise just iperf

Note that " Almost Adequate " implies meeting the requirement excluding the usual 50% contingency factor.

Ratings History:
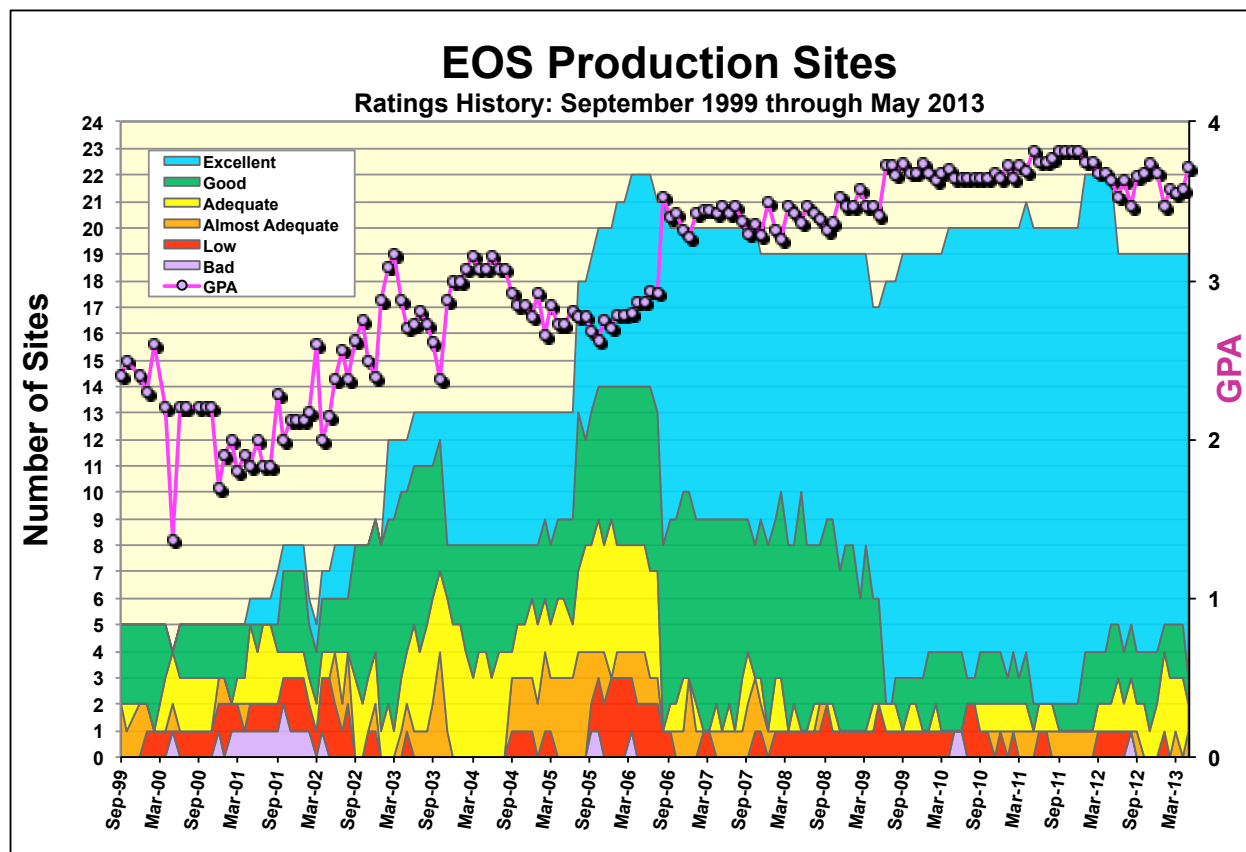
The chart above shows the number of sites in each rating category since EOS Production Site testing started in September 1999. Note that these ratings do NOT relate to absolute performance – they are relative to the EOS requirements.

Additions and deletions:

        2011 April: Added RSS to GHRC
        2011 May: Deleted WSC to ASF for ALOS
        2012 January: Added NOAA → GSFC-SD3E
                                Added GSFC-SD3E → Wisconsin
        2012 June: Deleted GSFC → LASP
                                Deleted GSFC ← → JAXA

Requirements Basis:

In June 2012, the requirements have been switched, as planned for quite a while, to use the EOSDIS network requirements database. ESDIS has been reviewing its network ICD's with each of the instrument teams. These ICDs are now essentially completed, and the database has been updated with the ICD values, so those values are now used here.
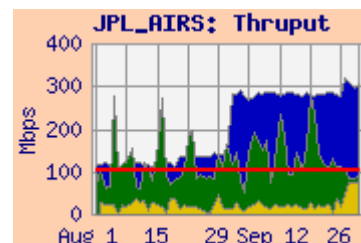
Previously, the requirements were based on the EOS Networks Requirements Handbook, Version 1.4.3 (from which the original database requirements were derived). Prior to that, the requirements were derived from version 1.4.2.

One main difference between Handbooks 1.4.2 and 1.4.3 is that in 1.4.3 most flows which occur less than once per day were averaged over their production period. These flows were typically monthly Level 3 data transfers, which were specified to be sent in just a few hours. However, they could easily be accommodated either between the per-orbit flows, or within the built-in contingency. Previously, these flows were added in linearly to the requirements, making the requirements unrealistically high.

Additionally, the contingency for reprocessing flows greater than 2X reprocessing was reduced. These flows WERE a major component of the contingency, so adding additional contingency on top of these flows was considered excessive.

Integrated Charts:

Integrated charts are included with site details, where available. These charts are "Area" charts, with a "salmon" background. A sample Integrated chart is shown here. The yellow area at the bottom represents the daily average of the user flow from the source facility (e.g., GSFC, in this example) to the destination facility (JPL, in this example) obtained from routers via "netflow". The green area is stacked on top of the user flow, and represents the "adjusted" daily average iperf thruput between the source-destination pair most closely corresponding to the requirement. This iperf measurement essentially shows the circuit capacity remaining with the user flows active. Adjustments are made to compensate for various systematic effects, and are best considered as an approximation. The red line is the requirement for the flow from the source to destination facilities. On some charts a blue area is also present – usually "behind" the green area – representing adjusted iperf measurements from a second source node at the same facility.
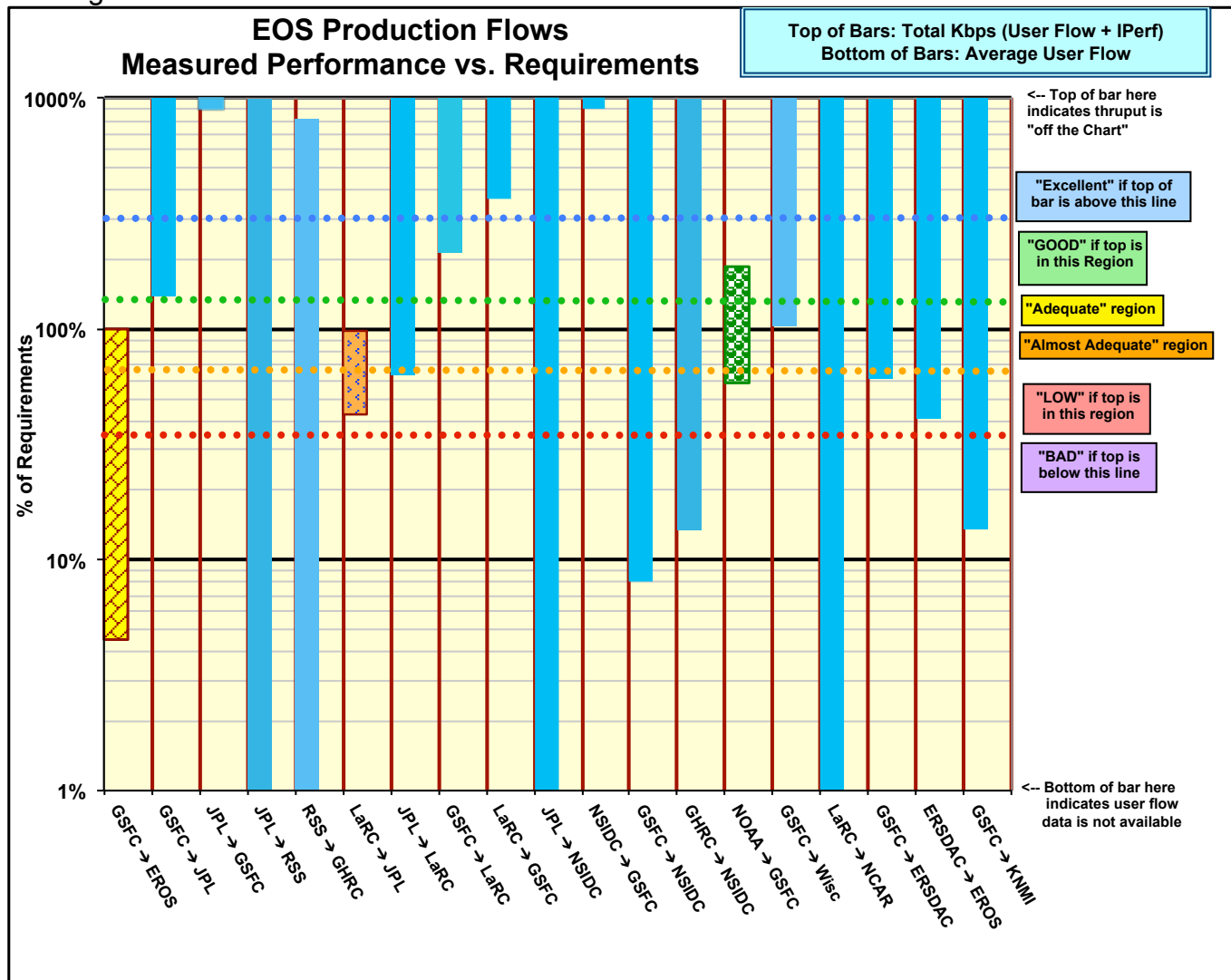
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Network Requirements vs. Measured Performance

May 2013 (Source ➔ Destination)	Instrument (s)	Requirements (mbps) Current Database	Requirements (mbps) Old HB 1.4.3+	Testing Source ➔ Dest Nodes	Testing Average User Flow mbps	Testing iperf Median mbps	Testing Integrated mbps	Ratings re Database Requirements This Month	Ratings re Database Requirements Last Month
GSFC ➔ EROS	MODIS, LandSat	548.4	342.9	MODAPS-PDR ➔ EROS LPDAAC	24.8	542.8	549.1	Adequate	Adq
GSFC ➔ JPL	AIRS, MLS, NPP, ISTs	63	116.7	NPP SD3E OPS2 ➔ JPL-AIRS	87.6	751.2	767.5	Excellent	Ex
JPL ➔ GSFC	MLS	0.57	0.6	JPL-PODAAC ➔ GSFC GES DISC	7.4	148.2	148.3	Excellent	Ex
JPL ➔ RSS	AMSR-E	0.16	0.5	JPL-PODAAC ➔ RSS (Comcast)		21.1		Excellent	Ex
RSS ➔ GHRC	AMSR-E	0.32	0.34	RSS (Comcast) ➔ GHRC (UAH)		2.59		Excellent	Adq
LaRC ➔ JPL	TES, MISR	83.5	69.3	LARC-ASDC ➔ JPL-TES	35.7	82.1		A A	Adq
JPL ➔ LaRC	TES	1.1	1.5	JPL-TES ➔ LARC-PTH	0.69	156.1		Excellent	Ex
GSFC ➔ LaRC	CERES, MISR, MOPITT, TES, MODIS	52.2	31.3	GSFC EDOS ➔ LaRC ASDC	111.4	736.1	755.9	Excellent	Ex
LaRC ➔ GSFC	MISR	0.6	0.4	LARC-ASDC ➔ GES DISC	2.04	852.3	852.3	Excellent	Ex
JPL ➔ NSIDC	AMSR-E	0.16	0.2	JPL-PODAAC ➔ NSIDC		176.5		Excellent	Ex
NSIDC ➔ GSFC	AMSR-E, MODIS, ICESAT	0.017	0.6	NSIDC DAAC ➔ GES DISC	1.20	410.8	410.8	Excellent	Ex
GSFC ➔ NSIDC	AMSR-E, MODIS, ICESAT	8.42	27.6	MODAPS PDR ➔ NSIDC-DAAC	0.7	606.7	606.7	Excellent	Ex
GHRC ➔ NSIDC	AMSR-E	0.46	0.5	GHRC ➔ NSIDC DAAC	0.06	13.2		Excellent	Ex
NOAA ➔ GSFC	NPP	522.3	615.6	NOAA-PTH ➔ GSFC NPP-SD3E OPS1	305.6	918.4	974.8	Good	Good
GSFC ➔ Wisc	NPP, MODIS, CERES, AIRS	259.1	253.7	GSFC NPP-SD3E OPS1 ➔ WISC	267.2	2738.1	2790.5	Excellent	Good
LaRC ➔ NCAR	MOPITT	0.044	0.1	LaRC-PTH ➔ NCAR		162.2		Excellent	Ex
GSFC ➔ JAXA	TRMM, AMSR-E, MODIS	3.51	0.1	GSFC ➔ JAXA	4.10	Testing discontinued: 31 March 2009		n/a	n/a
JAXA ➔ GSFC	AMSR-E	0.16	0.1	JAXA ➔ GSFC	0.34			n/a	n/a
GSFC ➔ ERSDAC	ASTER	6.75	5.4	GSFC-EDOS ➔ ERSDAC	4.1	188.6	188.6	Excellent	Ex
ERSDAC ➔ EROS	ASTER	8.3	8.3	ERSDAC ➔ EROS PTH	3.4	136.2	141.6	Excellent	Ex
GSFC ➔ KNMI	OMI	13.4	0.03	GSFC-OMISIPS ➔ KNMI ODPS	1.8	330.1	330.1	Excellent	Ex

Significant change from HB v1.4.3 to Requirements Database

Value used for ratings

*Criteria:		
Excellent	Total Kbps > Requirement * 3	
Good	1.3 * Requirement <= Total Kbps < Requirement * 3	
Adequate	Requirement < Total Kbps < Requirement * 1.3	
Almost Adequate	Requirement / 1.5 < Total Kbps < Requirement	
Low	Requirement / 3 < Total Kbps < Requirement / 1.5	
Bad	Total Kbps < Requirement / 3	

Ratings Summary

	Database Req Score	Prev
Excellent	16	14
Good	1	2
Adequate	1	3
Almost Adequate	1	0
Low	0	0
Bad	0	0
Total Sites	19	19
GPA	3.71	3.58

Notes: Flow Requirements include:
TRMM, Terra, Aqua, Aura, ICESAT, QuikScat, GEOS, NPP

EOS WAN Production Flows

30 Day Averages (mbps) ending 2013-June-1

Color scheme shown: Absolute
Switch to Relative

Flow Value Colors:

0 mbps	< 1 mbps	1 - 2 mbps	2 - 5 mbps	5 - 10 mbps	10 - 20 mbps	20 - 50 mbps	50 - 100 mbps

100 - 200 mbps	200 - 500 mbps	500 mbps - 1 gbps	1 - 2 gbps	> 2 gbps

— NASA Circuit
— Non-NASA Circuit

DAAC
SIPS
Partner

This chart shows the averages for the main EOS production flows for the current month. Up to date flow information can be found at http://ensight.eos.nasa.gov/Weather/web/hourly/Production_Flows-A.shtml

This graph shows a bar for each source-destination pair – relating the measurements to the requirements for that pair. The bottom of each bar represents the average measured user flow from the source site to the destination site (as a percent of the requirement) – it indicates the relationship between the requirements and actual flows. Note that the requirements generally include a 50% contingency factor above what was specified by the projects, so a value of 67% (dotted orange line) would indicate that the project is flowing as much data as requested. The top of each bar similarly represents the integrated measurement, combining the user flow with Iperf measurements – this value is used to determine the ratings.

EOS Production Flows
Measured Performance vs. Requirements

Top of Bars: Total Kbps (User Flow + IPerf)
Bottom of Bars: Average User Flow

<-- Top of bar here indicates thruput is "off the Chart"

"Excellent" if top of bar is above this line

"GOOD" if top is in this Region

"Adequate" region

"Almost Adequate" region

"LOW" if top is in this region

"BAD" if top is below this line

<-- Bottom of bar here indicates user flow data is not available

% of Requirements

1000%   100%   10%   1%

GSFC → EROS, GSFC → JPL, JPL → GSFC, JPL → RSS, RSS → GHRC, LaRC → JPL, JPL → LaRC, GSFC → LaRC, LaRC → GSFC, JPL → NSIDC, NSIDC → GSFC, GSFC → NSIDC, GHRC → NSIDC, NOAA → GSFC, GSFC → Wisc, LaRC → NCAR, GSFC → ERSDAC, ERSDAC → EROS, GSFC → KNMI

1) EROS:

Ratings: GSFC→ EROS: Continued **Adequate**
ERSDAC→ EROS: Continued **Excellent**

Web Page: http://ensight.eos.nasa.gov/Organizations/production/EROS.shtml
http://ensight.eos.nasa.gov/Organizations/production/EROS_PTH.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
MODAPS-PDR→ EROS LPDAAC	756.6	542.8	266.1	24.8	549.1
GSFC-EDOS → EROS LPDAAC	305.2	272.4	69.9		
GES DISC → EROS LPDAAC	393.3	347.7	168.1		
GSFC-ENPL → EROS LPDAAC	1155.1	1151.7	1108.3		
ERSDAC→ EROS LPDAAC	205.7	136.2	42.0	3.41	141.6
NSIDC SIDADS→ EROS PTH	758.5	638.4	118.3		
GSFC-ENPL → EROS PTH	2324.2	2276.7	1990.2		
GSFC-ENPL → EROS PTH (IPv6)	864.6	784.6	648.9		
GSFC-NISN → EROS PTH	859.0	780.7	522.4		
ESDIS-PS → EROS PTH	873.7	798.9	354.0		
ESDIS-PS → EROS PTH (IPv6)	n/a	n/a	n/a		
LaRC PTH→ EROS PTH	180.1	161.2	120.2		
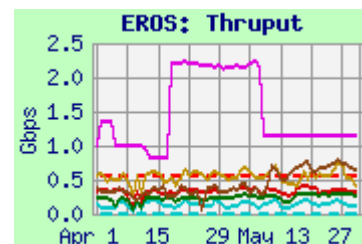
Requirements:

Source → Dest	Date	mbps	prev	Rating
GSFC → EROS	CY '12 -	548.4	343	**Adequate**
ERSDAC → EROS	FY '06 –	8.33	8.3	**Excellent**
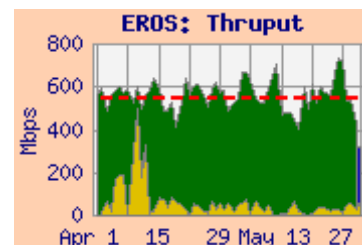
Comments:

1.1 GSFC → EROS: The rating is based on the **MODAPS-PDR** Server to EROS LP DAAC measurement, since that is the primary flow. The requirement was increased 60% in June '12, switching to the requirements database, based primarily on increased MODIS reprocessing. There was a peak in user flow close to the requirement in early April, but the average this month is only about 4.5% of the new requirement (close to typical).   The median integrated thruput from **MODAPS-PDR** to LPDAAC remains above the requirement, with contingency, but only slightly (less than 30%), so the rating remains **Adequate** . Thruput from GES DISC (also on EBnet) has been stable since late February, when the GES DISC firewall was upgraded.
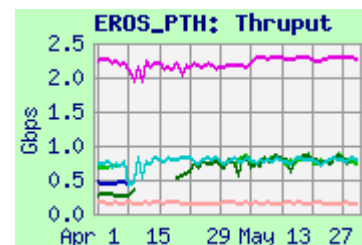
The route from **MODAPS-PDR** is via EBnet, to the Doors, to the NISN 10 gbps backbone to the NISN Chicago CIEF, then via GigE, peering at the StarLight Gigapop with the EROS OC-48 tail circuit.

Iperf testing for comparison is performed from **GSFC-ENPL** to both LPDAAC (the "FTL" node, outside the EROS firewall) and to EROS-PTH (both 10 gig hosts) using both IPv4 and IPv6. The route from **GSFC-ENPL** to EROS is via a direct 10 gig connection to the MAX, to Internet2 to StarLight in Chicago. **GSFC-ENPL** (IPv4) to EROS-PTH now typically gets over 2 gbps. This shows that the capacity of the network is well in excess of the requirement – it would be rated **Excellent** . IPv6 tests appear limited below 1 gbps.

1.2 ERSD → EROS: **Excellent** . See section 9 (ERSD) for further discussion.

1.3 NSIDC → EROS-PTH: Performance has been noisy but stable since September 2012.

1.4 LaRC → EROS: The thruput from LaRC-PTH to EROS-PTH was very stable. The route is via NISN SIP to the Chicago CIEF to StarLight – similar to EBnet sources. Note that LaRC-PTH outflow is limited to 200 mbps by NISN at LaRC.

2) to GSFC
2.1) to NPP, GES DISC, etc.

Ratings: NOAA → NPP SD3E: Continued **Good**
NSIDC → GES DISC: Continued **Excellent**
LDAAC → GES DISC: Continued **Excellent**
JPL → GSFC: Continued **Excellent**

Web Pages:

http://ensight.eos.nasa.gov/Missions/NPP/GSFC_SD3E.shtml
http://ensight.eos.nasa.gov/Organizations/production/GDAAC.shtml
http://ensight.eos.nasa.gov/Organizations/production/ESDIS_PTH.shtml
http://ensight.eos.nasa.gov/Missions/icesat/GSFC_ISIPS.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
NOAA-PTH → NPP-SD3E-OPS1	938.3	918.4	854.7	305.6	974.8
EROS LPDAAC → GES DISC	498.7	346.9	134.7		
EROS PTH → GSFC-ESDIS PTH	653.8	513.5	244.3		
JPL-PTH → GSFC-ESDIS PTH	92.2	92.2	92.0	7.4	
JPL-TES → GSFC-NISN	484.5	228.7	53.7		
LaRC ASDC → GES DISC	896.3	852.3	129.3	2.0	
LARC-ANGe → GSFC-ESDIS PTH	936.8	936.3	927.4		
NSIDC DAAC → GES DISC	421.8	410.8	325.8	1.2	
NSIDC DAAC → GSFC-ISIPS (scp)	76.0	74.0	51.4		

Requirements:

Source → Dest	Date	Mbps	Prev	Rating
NSIDC → GSFC	CY '12 –	0.017	0.6	**Excellent**
LaRC ASDC → GES DISC	CY '12 –	0.6	0.4	**Excellent**
JPL → GSFC combined	CY '12 –	0.57	3.2	**Excellent**
NOAA → NPP SD3E	CY '12 –	522.3	615.6	**Good**

Comments:

NOAA → NPP-SD3E: Performance from **NOAA-PTH** to GSFC NPP-SD3E-OPS1 was very steady at over 900 mbps, limited by the gig-E interfaces on the NOAA side test machine (the circuits are all 10 gbps). User flow was steady, and close to the requirement (without contingency).

EROS LPDAAC, EROS-PTH → GSFC: The thruput for tests from **EROS** to GES DISC and from **EROS-PTH** to ESDIS-PTH improved this month, probably due to return route change.

JPL → GSFC: Thruput from **JPL-PTH** is limited by the Fast-E interface on **JPL-PTH**. With the modest requirement the rating remains **Excellent**. The 7.4 mbps average user flow was above typical and well above the old and new [reduced] requirement. Testing from JPL-TES to GSFC-NISN (not graphed) more clearly shows the capability of the network. Note that JPL → EBnet flows take Internet2 instead of NISN, based on JPL routing policies.

LaRC → GSFC: Performance from **LaRC ASDC** to GES DISC was noisy last month, due to congestion at ASDC. Thruput from **LaRC ANGe** to ESDIS-PTH was much more stable. Both results remained way above 3 x the modest requirement, so the rating continues as **Excellent**. The user flow this month was again much higher than the requirement.
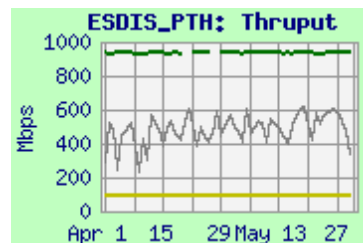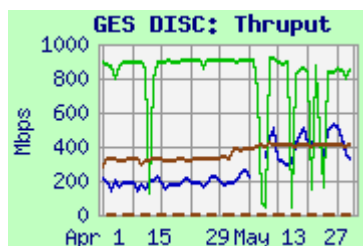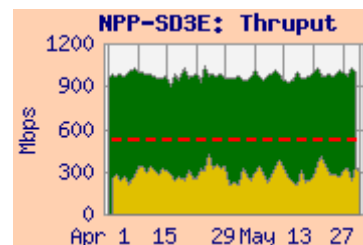
NSIDC → GSFC: Performance from **NSIDC** to GES DISC improved around 1 May, apparently due to I2 route changes. It was way above the tiny requirement; the rating remains **Excellent.** The user flow was again above the old requirement, and well above the new lower requirement. Thruput to GSFC-ISIPS using SCP (iperf testing still down after reconfiguration due to blocking) is lower than iperf previously, as expected, but also improved in early May, and remains well above the requirement.
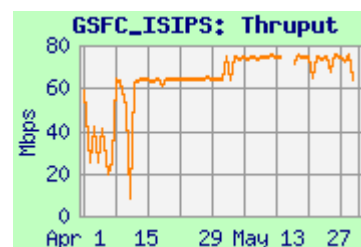
2.2 GSFC-ECHO: EOS Metadata Clearinghouse

Web Page: http://ensight.eos.nasa.gov/Organizations/gsfc/GSFC_ECHO.shtml

Test Results:

Source	Medians of daily tests (mbps)		
	Best	Median	Worst
EROS LPDAAC	291.4	219.5	107.5
EROS LPDAAC ftp	138.7	87.6	25.3
GES DISC	926.3	909.2	891.1
GES DISC ftp	935.7	884.0	540.5
LaRC ASDC DAAC	551.4	520.1	57.6
LaRC ASDC DAAC ftp	n/a	n/a	n/a
NSIDC DAAC	261.1	245.9	184.9
NSIDC DAAC ftp	182.6	154.4	83.0
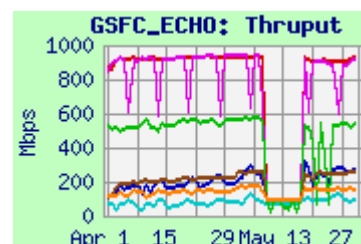
Comments: Performance was mostly stable from all sites, except in early May, when the ECHO server reconfigured itself for Fast Ethernet (100 mbps), until it was corrected about 9 days later. Performance improved slightly from **EROS LPDAAC** and **NSIDC** in early May due to improved Internet2 routing. Performance from **LaRC ASDC** was very noisy due to congestion at **LaRC ASDC**. FTP performance is mostly limited by TCP window size – especially from sites with long RTT.

2.3 GSFC-EMS: EOS Metrics System

Web Page: http://ensight.eos.nasa.gov/Organizations/gsfc/GSFC_EMS.shtml

Test Results:

Source	Medians of daily tests (mbps)		
	Best	Median	Worst
EROS LPDAAC	313.2	251.4	103.7
ESDIS-PTH	938.5	936.1	786.4
GES DISC	915.3	905.3	485.4
LARC ASDC	499.1	428.7	14.6
MODAPS-PDR	936.5	931.4	312.2
NSIDC-SIDADS	288.5	284.8	240.6
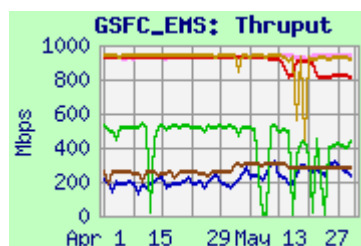
Comments: Testing is performed to GSFC-EMS from the above nodes, iperf only. Performance improved slightly from **EROS LPDAAC** and **NSIDC** in early May due to improved Internet2 routing. Performance from **LaRC ASDC** was very noisy due to congestion at **LaRC ASDC**. Performance was quite stable from other sources.
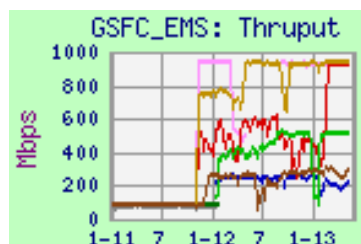
3) JPL:
3.1) GSFC → JPL: Ratings: GSFC → JPL: Continued Excellent

Web Pages: http://ensight.eos.nasa.gov/Missions/aqua/JPL_AIRS.shtml
http://ensight.eos.nasa.gov/Missions/aura/JPL_MLS.shtml
http://ensight.eos.nasa.gov/Missions/NPP/JPL_SOUNDER.shtml
http://ensight.eos.nasa.gov/Organizations/production/JPL_QSCAT.shtml
http://ensight.eos.nasa.gov/Organizations/production/JPL_PODAAC.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
GSFC-GES DISC→ JPL-AIRS	251.4	230.2	174.5	87.6	258.3
NPP-SD3E-OPS2→ JPL-AIRS	817.2	751.2	438.9		
GSFC-NISN → JPL-AIRS	591.2	392.3	188.0		
ESDIS-PTH → JPL-AIRS	412.9	331.9	141.3		
NPP IDPS-Mini-inf → JPL-Sounder	129.3	93.8	43.4		
GSFC-NISN → JPL-MLS	377.2	284.6	183.2		
ESDIS-PTH → JPL-MLS	264.1	238.5	156.5		
ESDIS-PTH → JPL-PODAAC	106.3	86.6	62.1		
GSFC-NISN → JPL- PODAAC	127.9	85.8	46.6		
MODAPS-PDR → JPL-PODAAC	70.5	51.2	32.9		
GSFC-NISN → JPL-QSCAT	88.1	84.8	73.3		
ESDIS-PS → JPL-QSCAT	92.9	91.4	85.3		
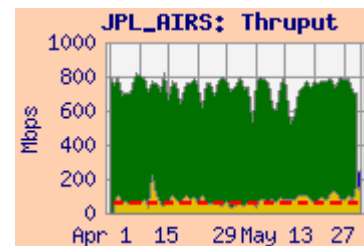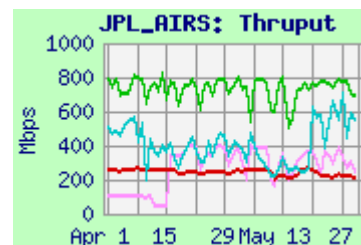
Requirements:

Source → Dest	Date	Mbps	Prev	Rating
GSFC → JPL Combined	CY '12-	63	116.7	Excellent
GSFC → JPL AIRS	CY '12-	40	98	Excellent
GSFC NPP → JPL Sounder	CY '12-	15	15	Excellent
GSFC → JPL MLS	CY '12-	1.0	2.1	Excellent

Comments:

AIRS , Overall: The requirements were switched in June '12 to use the requirements database, instead of the Handbook v1.4.3 previously. This resulted in a 46% decrease in the overall requirement.

The Integrated thruput from **GES DISC** remains above 3 x the reduced AIRS requirement, so the AIRS rating remains **Excellent** .

The **JPL overall rating** is based on the **NPP-SD3E-OPS2** to JPL AIRS thruput, compared with the sum of all the GSFC to JPL requirements. The median thruput remained above 3 x this requirement, so the overall rating remains **Excellent** . Note that the average user flow this month was above the requirement (including contingency), and higher than the 63 mbps last month (which was also above the requirement).

NPP to JPL Sounder: Testing from **NPP IDPS-Mini-inf** to the JPL Sounder PEATE was mostly stable. The rating remains **Excellent** .
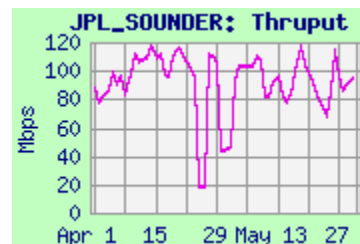
3.1) GSFC → JPL: continued

MLS: Thruput from both **ESDIS-PTH** and **GSFC-NISN** was mostly stable this month. Both were way above the modest requirement, so the rating remains **Excellent** .

PODAAC: There is no longer a requirement from GSFC to JPL PODAAC in the database. But thruput was way above the previous 1.5 mbps PODAAC requirement.

QSCAT: There is no longer a requirement from GSFC to JPL QSCAT in the database. Thuput from **ESDIS-PS** to QSCAT improved in March with retuning. It remains well above the modest previous 0.6 mbps requirement.
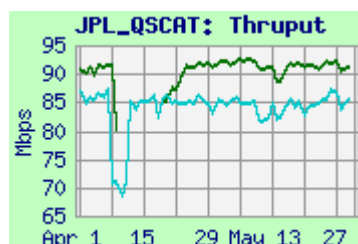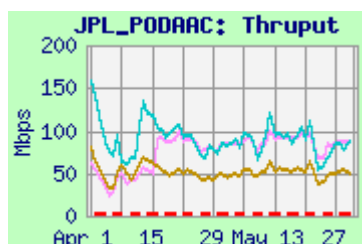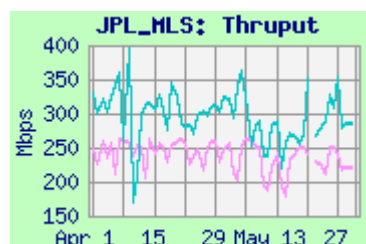
3.2) JPL → LaRC   Rating: Continued **Excellent**

Web Page: http://ensight.eos.nasa.gov/Organizations/production/LARC_PTH.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow
	Best	**Median**	**Worst**	
JPL-PTH → LaRC PTH	88.9	88.7	88.6	0.69
JPL-TES → LaRC PTH	288.9	156.1	51.2	

Requirements:

Source → Dest	Date	Mbps	Prev	Rating
JPL → LaRC	CY '12 –	1.1	1.5	**Excellent**

Comment: This requirement is primarily for TES products produced at the TES SIPS at JPL, being returned to LaRC for archiving. The route from JPL to LaRC is via NISN PIP. This month the thruput from **JPL-TES** was again noisy but remained much higher than the requirement; the rating remains **Excellent** . The user flow this month was about double that of last month, and very close the requirement without contingency.

Thruput from **JPL-PTH** to LaRC-PTH switched from the lower of its two common states (60 mbps), to the higher state (88 mbps) in mid January 2013. It is limited by a Fast–E interface on **JPL-PTH**.
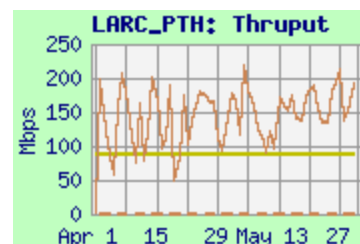
3.3) LaRC → JPL   Rating: ↓ Adequate → Almost Adequate

Web Pages:

> http://ensight.eos.nasa.gov/Organizations/production/JPL_TES.shtml
> http://ensight.eos.nasa.gov/Missions/terra/JPL_MISR.shtml
> http://ensight.eos.nasa.gov/Organizations/production/JPL_PTH.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	**Median**	**Worst**		
LaRC ASDC → JPL-MISR	67.4	53.9	9.5	9.7	63.0
LaRC PTH → JPL-MISR	75.9	69.4	48.3		
LaRC ASDC → JPL-TES	95.8	82.1	5.6		
LaRC ANGE → JPL-TES	361.7	285.8	206.6		
LaRC PTH → JPL-TES	177.9	147.6	100.8		
LaRC PTH → JPL-TES sftp	26.6	26.0	7.3		
LaRC ANGE → JPL-PTH	87.9	86.1	82.7	35.7	

Requirements:

Source → Dest	Date	Mbps	Prev	Rating
LaRC → JPL-Combined	CY '12 –	83.5	69.3	Almost Adq
LaRC ASDC → JPL-MISR	CY '12 –	78.1	62.3	Almost Adq
LaRC ASDC → JPL-TES	CY '12 –	5.5	7.0	Excellent

Note: Performance from LaRC ASDC to JPL (also from LaRC ASDC to most other destinations) was very variable, beginning at the end of April 2012, apparently due to congestion at ASDC. After mid July, the thruput from LaRC ASDC stayed low and has often been noisy – but sometimes stable. **Performance from LaRC ANGe and LaRC PTH to JPL was stable and did not exhibit this characteristic.**


LaRC → JPL (MISR): LaRC ASDC to JPL MISR thruput is limited by the Fast-E connection to the MISR node, and the ASDC congestion. User flow was higher than usual, but much lower than the requirement. The median integrated thruput remains slightly below the MISR requirement, so the MISR rating remains Almost Adequate.

LaRC → JPL (Overall, TES): Thruput from LaRC ASDC DAAC to JPL-TES was very unstable in May, due to the congestion above. The median dropped below the combined requirements, so the Overall rating drops to Almost Adequate.

The median thruput remained well over 3 x the TES requirement, so the TES rating remains Excellent. User flow to TES is very low.

The JPL-PTH integrated graph shows the overall LaRC to JPL user flow (vs. the overall requirement). The total LaRC → JPL user flow was unusually high in May.

The true capacity of the network is better seen with the LaRC ANGe → JPL-TES thruput, which is not subject to the ASDC congestion. The Overall rating based on this test would be Excellent. Performance from LaRC PTH to JPL-TES is stable, better than from LaRC ASDC, but is limited to 200 mbps by NISN.
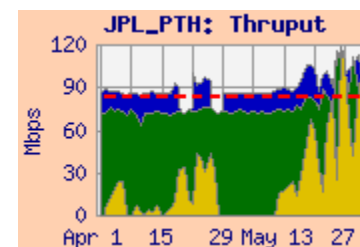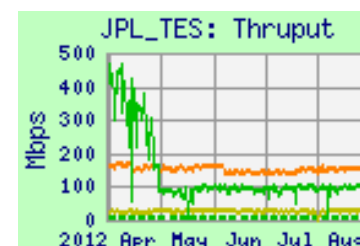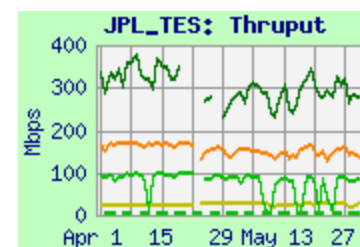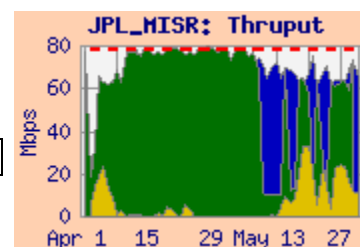
4) GSFC → LaRC: <u>Rating</u>: Continued Excellent

Web Pages : http ://ensight.eos.nasa.gov/Organizations/production/LARC.shtml
             http://ensight.eos.nasa.gov/Organizations/production/LARC_ANGe.shtml
             http://ensight.eos.nasa.gov/Organizations/production/LARC_PTH.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
GES DISC → LaRC ASDC	934.3	902.4	417.9	111.4	905.2
GSFC-EDOS → LaRC ASDC	863.1	736.1	164.5		
ESDIS-PTH → LaRC-ANGe	921.7	892.7	538.9		
GSFC-NISN → LaRC-ANGe	871.2	835.2	731.4		

Requirements:

Source → Dest	Date	Mbps	Prev	Rating
GSFC → LARC (Combined)	CY '12 –	52.2	31.3	**Excellent**

Comments:

GSFC → LaRC ASDC: Thruput from **GES DISC** to LaRC ASDC DAAC remained well above 3 x the increased combined requirement, so the rating remains Excellent . Thruput to ASDC from GSFC-EDOS was noisy but stable.

As seen on the integrated graph, the 111 mbps average user flow this month was above both normal and the requirement (the flow averaged 68 mbps last month, and 45 mbps the month before that).

 ANGe (LaTIS): Testing to ANGe ("Bob") from **ESDIS-PTH** improved in March due to increased window size and retuning, and was similar to performance from **GSFC-NISN**.
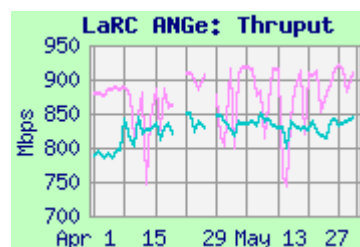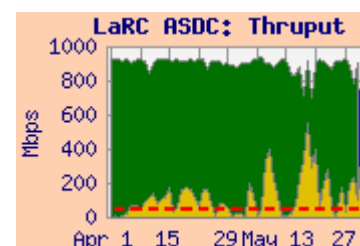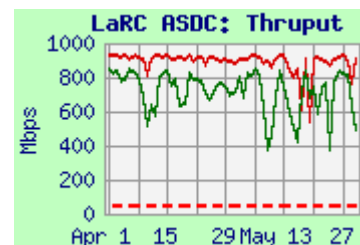
5) Boulder CO sites:

5.1) NSIDC:

Ratings: GSFC → NSIDC: Continued **Excellent**
JPL → NSIDC: Continued **Excellent**
GHRC → NSIDC: Continued **Excellent**

Web Pages: http://ensight.eos.nasa.gov/Organizations/production/NSIDC.shtml
http://ensight.eos.nasa.gov/Organizations/production/NSIDC_SIDADS.shtml
http://ensight.eos.nasa.gov/Organizations/production/NSIDC_PTH.shtml

Test Results: **NSIDC S4PA**

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
MODAPS-PDR → NSIDC DAAC	618.4	606.7	467.3	0.7	606.7
GES-DISC → NSIDC DAAC	504.9	504.2	477.7		
GSFC-EDOS → NSIDC DAAC	161.8	159.2	130.7		
ESDIS-PTH → NSIDC DAAC	607.4	606.4	581.6		
GSFC-ISIPS → NSIDC (iperf)	138.4	135.0	122.1		
JPL PODAAC → NSIDC DAAC	193.8	176.5	115.9		
GHRC → NSIDC DAAC (nuttcp)	30.1	13.2	5.2		
GHRC → NSIDC DAAC (ftp pull)	49.4	28.7	3.5		

Requirements:

Source → Dest	Date	Mbps	Prev	Rating
GSFC → NSIDC	CY '12 –	8.42	27.6	**Excellent**
JPL → NSIDC	CY '12 –	0.16	0.2	**Excellent**
GHRC → NSIDC	CY '12 –	0.46	0.5	**Excellent**

Comments: GSFC → NSIDC S4PA: Thruput from all sources dropped about 10% in late March, due to increased RTT – corrected in late April..

The rating is based on testing from the **MODAPS-PDR** server to the NSIDC DAAC. The requirement was reduced in May '09 from 34.5 mbps (and was 64 mbps in April '08). The integrated thruput from **MODAPS-PDR** remains well above 3 x the requirement, so the rating remains **Excellent**. The 0.7 mbps average user flow was close to typical, but well below the requirement, and below last month's 13.2 mbps, which was due to an exceptional burst.

JPL PODAAC → NSIDC S4PA: The requirement was reduced from 1.34 mbps in May '09. Thruput from **JPL PODAAC** to NSIDC has been mostly stable since it improved dramatically in mid December, and again in mid May due to the RTT decrease; the rating remains **Excellent**.

GHRC, GHRC-ftp → NSIDC S4PA: GHRC (NSSTC, UAH, Huntsville, AL) sends AMSR-E data to NSIDC via NLR / Internet2. FTP Thruput improved in late May with retuning. The median thruput remained well above 3 x the 0.46 mbps requirement, so the rating remains **Excellent**.
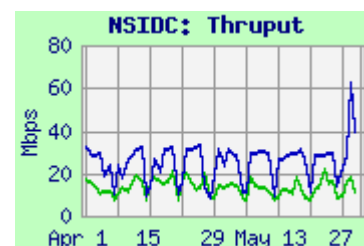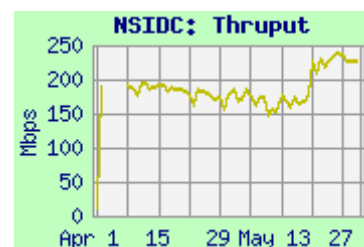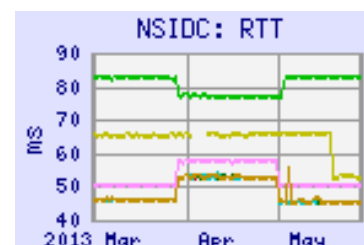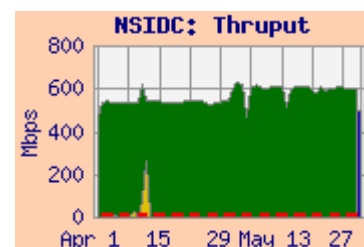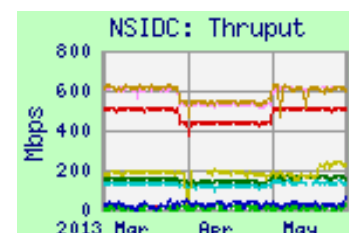
5) Boulder CO sites (Continued):
5.1) NSIDC: (Continued):

Test Results: NSIDC SIDADS, NSIDC-PTH

Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
GSFC-ENPL → NSIDC-SIDADS	270.3	262.2	221.8
GSFC-NISN → NSIDC-SIDADS	271.8	270.3	246.3
ESDIS-PTH → NSIDC-PTH	336.2	263.0	199.4
MODAPS-PDR → NSIDC-PTH	230.9	182.6	149.9
JPL PTH → NSIDC-PTH	89.1	89.0	83.7

GSFC → NSIDC-SIDADS: The performance to from GSFC to NSIDC-SIDADS improved in mid April via both NISN and Internet2. Performance changed slightly at the end of April due to RTT changes.

NSIDC-PTH: Thruput from both GSFC sources dropped about 10% (similar to thruput to NSIDC DAAC), due to the RTT increase in late April, and recovered in late May. Thruput from JPL was very stable.
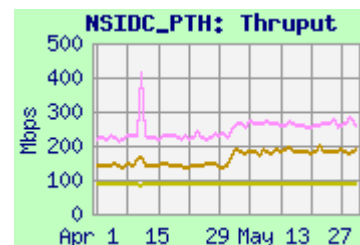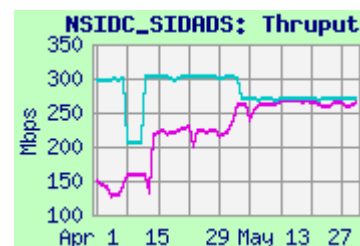
## 5.2) LASP: Ratings: LASP → GSFC: Continued **Excellent**
Web Page: http://ensight.eos.nasa.gov/Organizations/production/LASP.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
ESDIS-PTH → LASP blue (scp)	3.65	3.47	2.85
ESDIS-PTH → LASP blue (iperf)	9.29	9.26	7.97
GES DISC → LASP blue (iperf)	6.89	6.88	6.12
LASP → GES DISC	9.33	9.31	9.23

Requirement:

Source → Dest	Date	Mbps	Rating
LASP → GES DISC	CY '10 -	0.016	**Excellent**

Comments: In January '11, LASP's connection to NISN PIP was rerouted: it previously was 100 mbps from CU-ITS via NSIDC; this was changed to a 10 mbps connection to the NISN POP in Denver.

Iperf testing from **GES DISC** has been stable since mid February, when it improved with the GES DISC firewall upgrade. Iperf and SCP testing from **ESDIS-PTH** was very stable, and consistent with the circuit limitation. Return testing from **LASP** to GES DISC was also very stable, rating **Excellent** .


5.3) UCB:
Web Page   http://ensight.eos.nasa.gov/Organizations/daac/UCB.shtml
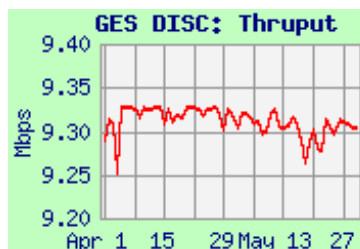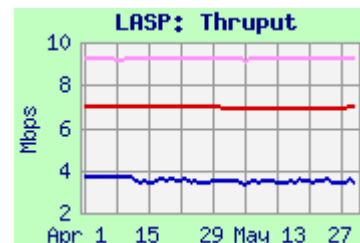
Test Results:

Source	Medians of daily tests (gbps)		
	Best	Median	Worst
GSFC-ENPL-10G	5.9	5.1	4.2

Comments: Testing is to a 10 gig connected test node at UCB. The route is via Internet2 to FRGP, similar to NCAR. Thruput dropped about 10% in late March, due to RTT increase (similar to thruput from GSFC to NSIDC DAAC), and was restored in late April..
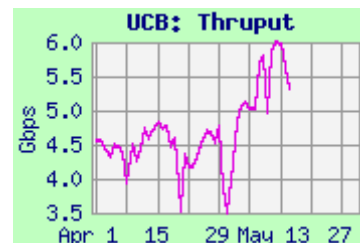
5.4) NCAR:

Ratings: LaRC → NCAR: Continued **Excellent**
GSFC → NCAR: Continued **Excellent**

Web Pages http://ensight.eos.nasa.gov/Missions/terra/NCAR.shtml

Test Results:

Source	Medians of daily tests (mbps)		
	Best	**Median**	**Worst**
LaRC PTH	183.3	162.2	112.1
GSFC-ENPL-10G	6081.4	4287.8	1509.4
GSFC-ENPL-FE	96.1	95.6	94.9
GSFC-NISN	794.7	628.2	414.2

Requirement:

| Source	Date	Mbps	Prev	Rating
LaRC	CY '12 -	0.044	0.1	**Excellent**
GSFC	CY '12 -	0.111	5.0	**Excellent**

Comments: NCAR has a SIPS for MOPITT (Terra, from LaRC), and has MOPITT and HIRDLS (Aura, from GSFC) QA requirements.

Testing was switched to NCAR's 10 gigabit capable PerfSonar server in March '12 – testing was discontinued from **LaRC ASDC** at that time; testing from **LaRC-PTH** continued.

From LaRC: Thruput from **LaRC-PTH** was well above 3 x the modest requirement, so the rating remains **Excellent** . Note that outflow from **LaRC-PTH** is limited to 200 mbps by NISN.

From GSFC: From **GSFC-NISN**, the route is via NISN to the MAX (similar route as from **LaRC-PTH**). The RTT from these NISN sources dropped in late March, and increased in late April, unlike GSFC to Boulder via Internet2 / NLR, which increased in March, and decreased in April. Thruput remained noisy this month, but stable, and well above 3 x the requirement, so the rating remains **Excellent** . The average user flow from GSFC this month was 2.1 mbps, close to usual, but about 20x the revised requirement.

From **GSFC-ENPL-10G**, with a 10 Gig-E interface, and a 10 gig connection to MAX, performance to NCAR's 10 Gig PerfSonar node is noisy, but gets around 6 gbps on peaks. Thruput dropped a bit in April, due to an increase in RTT (similar to thruput from GSFC to other Boulder sites), and increased again in May.
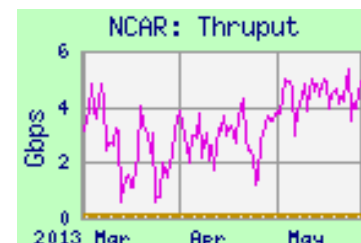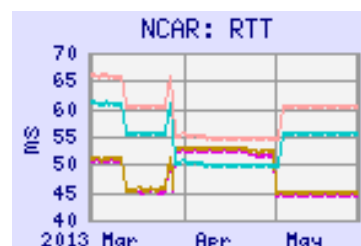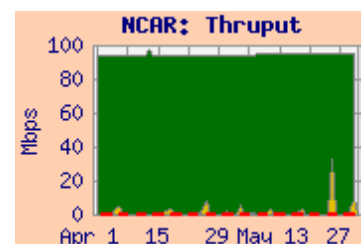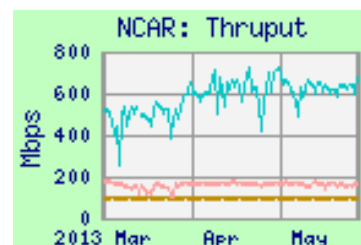
6) Remote Sensing Systems (RSS):   Ratings: JPL → RSS: Continued **Excellent**
RSS → GHRC: ↑ **Adequate** → **Excellent**

Web Page   http://ensight.eos.nasa.gov/Missions/aqua/RSS.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)		
	Best	**Median**	**Worst**
JPL PODAAC → RSS (Comcast)	37.3	24.4	1.4
JPL TES → RSS (Comcast)	43.0	21.1	2.9
GSFC-NISN → RSS (Comcast)	49.3	45.5	33.9
GHRC-UAH → RSS (Comcast)	43.7	14.1	1.1
GHRC-NISN → RSS (Comcast)	17.6	7.0	2.7
RSS (Comcast) → GHRC (UAH)	3.92	2.59	0.94
RSS (Comcast) → GHRC (NISN)	3.78	2.75	0.89
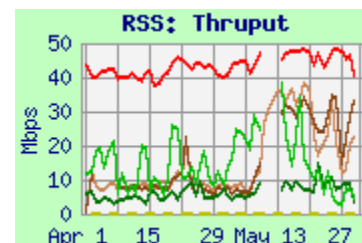
Requirements:

Source → Dest	Date	Mbps	Prev	Rating
JPL PODAAC → RSS	CY '12 -	0.16	0.49	**Excellent**
RSS → GHRC	CY '12 -	0.32	0.34	**Excellent**

Comments: RSS (Santa Rosa, CA) is a SIPS for AMSR-E (Aqua), receiving L1 data from JAXA via JPL, and sending its processed L2 results to GHRC (aka NSSTC) (UAH, Huntsville, AL).

At the end of March '12, RSS switched its production node from the NISN SIP circuit (4 x T1s to NASA ARC -- total 6 mbps) to the Comcast circuit, rated at 50 mbps incoming, and 12 mbps outgoing (installed in April 2011). Testing via the NISN circuit to RSS was discontinued at that time.

JPL → RSS: It appears that the peering between JPL and Comcast improved in early May after degrading in March. The median iperf from JPL remained well above 3 x the reduced requirement, so the rating from JPL remains **Excellent**.

GHRC → RSS: Testing from the **UAH** server at GHRC was noisy but stable, with significant diurnal variation. Testing from the **NISN** server at GHRC was also noisy and lower than from UAH.

RSS → GHRC: The server at RSS on the Comcast circuit allows "3rd party" testing, as do the servers at GHRC. Testing is therefore performed between RSS and GHRC, both with a **UAH** address and a **NISN** address at GHRC.

The results to the two destinations are very similar; both dropped severely in early January, but recovered to their previous noisy state in early February, then stabilized at a lower level in March, and improved in May. The performance from both sources is now above 3 x the requirement, so the rating improves to **Excellent**
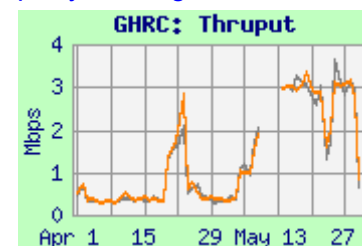
7) Wisconsin: Rating: ↑ Good → Excellent

Web Pages   http://ensight.eos.nasa.gov/Missions/NPP/WISC.shtml

Test Results:

Source Node	Medians of daily tests (mbps)			User Flow	Integrated
	Best	**Median**	**Worst**		
NPP-SD3E	2950.2	2738.1	2156.6	267.2	2790.5
GES DISC	933.2	932.3	925.1		
GSFC ENPL	3599.8	3408.2	2672.4		
LaRC ANGe	567.3	537.8	199.2		

Requirements:

| Source Node	Date	mbps	Prev	Rating
NPP-SD3E	CY'12 -	237.2	237.2	**Excellent**
GSFC MODAPS	CY'12 -	21.9	16.5	**Excellent**
GSFC Combined	CY'12 -	259.1	253.7	**Excellent**
LaRC Combined	CY'12 -	n/a	7.9	**n/a**

Comments: The University of Wisconsin is included in this Production report due to its function as Atmosphere PEATE for NPP. Wisconsin continues to be an SCF on the MODIS, CERES and AIRS teams.

GSFC: Thruput to Wisconsin changed several times in April and May. At the end of March, testing from **GSFC-ENPL** was switched to a new 10 gig server at Wisconsin (SSEC), with much improved thruput This testing was retuned (increased window size on the Wisc server) in mid April, with further improvement – now above 1 gbps. It was retuned again at the beginning of May, with thruput now around 3.5 gbps.

User flow was high, and close to the requirement, and similar to last month. Testing from **NPP-SD3E** was also retuned at the beginning of May, with thruput typically around 2.7 gbps! The integrated thruput from **NPP-SD3E** was above the NPP requirement by more than 3 x, so the NPP rating improves to **Excellent**. It was also above the GSFC combined requirement by more than 3 x, so that rating remains also improves to **Excellent**.

The route from EBnet at GSFC is via MAX to Internet2, peering with MREN in Chicago.

LaRC: There is no longer a CERES requirement from LaRC to Wisconsin. On 23 April, testing from **LaRC ANGe** was switched to the new SSEC 10 gig server; performance improved at that time. Thruput from **LaRC ANGe** is stable, and well above the previous 7.9 mbps requirement; it would be rated **Excellent**. The route from LaRC is via NISN, peering with MREN in Chicago.
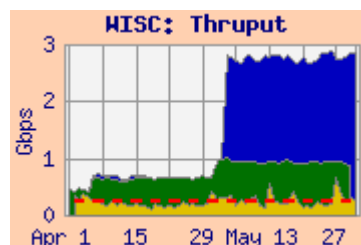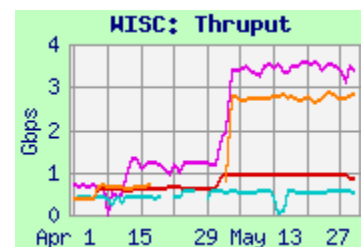
8) KNMI: Rating: Continued **Excellent**

Web Pages   http://ensight.eos.nasa.gov/Missions/aura/KNMI_ODPS.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			
	Best	**Median**	**Worst**	**Reqmt**
OMISIPS → KNMI-ODPS	485.9	330.1	142.2	13.4
GSFC-ENPL → KNMI-ODPS	707.9	534.8	386.8	

Comments: KNMI (DeBilt, Netherlands) is a SIPS and QA site for OMI (Aura). The route from GSFC is via MAX to Internet2, peering in DC with Géant's 2 x 10 gbps circuit to Frankfurt, then via Surfnet through Amsterdam.

The requirement was increased with the use of the database to 13.4 mbps, a much more realistic value than the previous 0.03 mbps.

The rating is based on the results from **OMISIPS** at GSFC to the ODPS primary server at KNMI. Thruput from **OMISIPS** (on EBnet) has been mostly stable. The median thruput remains much more than 3 x the increased requirement, so the rating remains **Excellent**.

The user flow, however, averaged only 1.8 mbps this month, similar to recent months, well below the requirement.
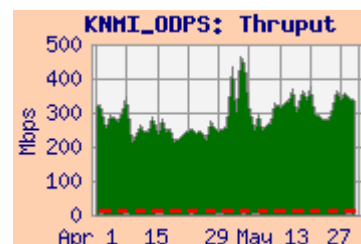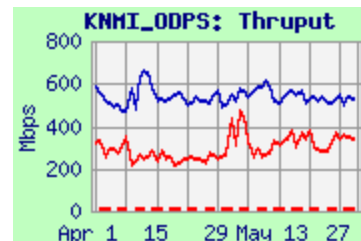
9) JSpace - ERSD:

Ratings: **GSFC → ERSD:** Continued `Excellent`
ERSD → EROS: Continued `Excellent`
ERSD → JPL-ASTER-IST: N/A

Web Page: http://ensight.eos.nasa.gov/Organizations/production/ERSDAC.shtml

US ←→ JSpace - ERSD Test Results

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
GSFC-EDOS → ERSD	349.4	188.6	54.9	4.1	188.6
GES DISC → ERSD	60.1	52.3	50.8		
GSFC ENPL (FE) → ERSD	91.9	91.5	90.9		
GSFC ENPL (GE) → ERSD	410.1	321.6	198.0		
ERSD → EROS	205.7	136.2	42.0	3.4	141.6
ERSD → JPL-ASTER IST	n/a	n/a	n/a		
ERSD → JPL-TES	92.6	62.7	37.5		

Requirements:

Source → Dest	CY	Mbps	Prev	Rating
GSFC → ERSD	'12 -	6.75	5.4	**Excellent**
ERSD→ JPL-ASTER IST	'12 -	0.31	0.31	**Excellent**
ERSD→ EROS	'12 -	8.33	8.3	**Excellent**

Comments: `GSFC → ERSD:` As of approximately September 2011, the ERSD test node is connected at 1 gbps – it was previously 100 mbps. The median thruput from most nodes improved at that time. Peak thruput from **GSFC ENPL** is often over 400 mbps.

Some nodes, however, (e.g., **EDOS**) had been using QoS (HTB) to reduce loss previously seen in the 1 gig to 100 meg switch at Tokyo-XP – so it initially remained limited by its HTB settings, and did not see much improvement. The **EDOS** HTB settings were raised in February, resulting in much higher average performance, although it was also very noisy.

Thruput from **GES DISC** stabilized and improved in mid February, due to the GES DISC firewall replacement.

Thruput remains well above 3 x the reduced requirement, so the rating remains `Excellent`. The user flow was close to normal this month, in both directions (after a burst last month), and remains consistent with the requirement.

The FastE connected **GSFC-ENPL-FE** node is limited to 100 mbps by its own interface, and gets very steady thruput.

ERSD → JPL-ASTER-IST: The JPL-ASTER-IST test node was retired in October 2012; a replacement node is being sought. As a substitute, testing was initiated from ERSD to a different node at JPL ("TES"). Results to TES were better than previously to the JPL-ASTER-IST, but are now similar. Either would be rated `Excellent` .

`ERSD → EROS:` The thruput improved with retuning in October '11, after the ERSDAC Gig-E upgrade; it remains well above the reduced requirement (was 26.8 mbps previously). The user flow was near normal this month. The median thruput is more than 3 x the reduced requirement, so the rating remains `Excellent`.

Site Details
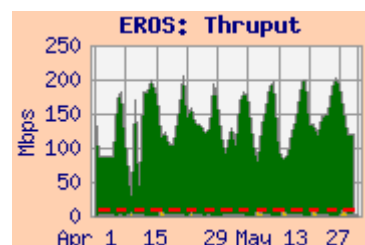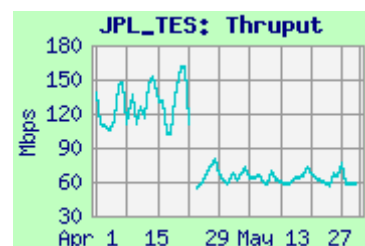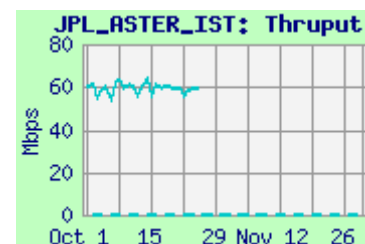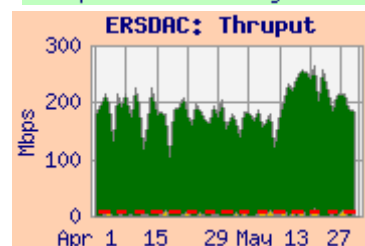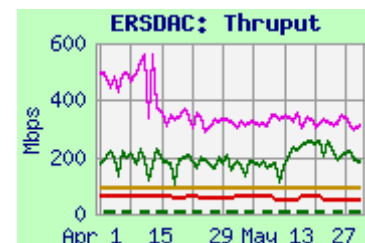
10) US ← → JAXA

Ratings: US → JAXA: N/A
JAXA → US: N/A

The JAXA test hosts at EOC Hatoyama were retired on March 31, 2009 (the end of the Japanese government's fiscal year). No additional testing is planned for AMSR or TRMM. All testing to JAXA-TKSC for ALOS was terminated at the end of June '09. JAXA has been requested to restore these tests – in preparation for GPM -- but has declined to participate.

However, the user flow between GSFC-EBnet and JAXA continues to be measured. As shown below, the user flow this month averaged 4.10 mbps from GSFC-EBnet to JAXA, and 0.34 mbps from JAXA to GSFC-EBnet. GSFC-EBnet to JAXA is very similar to last month, while JAXA to GSFC-EBnet was much higher last month (1.54 mbps).

These values are more or less consistent with the new (database) requirements of 3.36 mbps to JAXA, and 1.31 mbps back to JPL. However, since no iperf tests are run, the true capability of the network cannot be determined, and therefore no rating is assigned.

Flow between GSFC-EBnet and JAXA
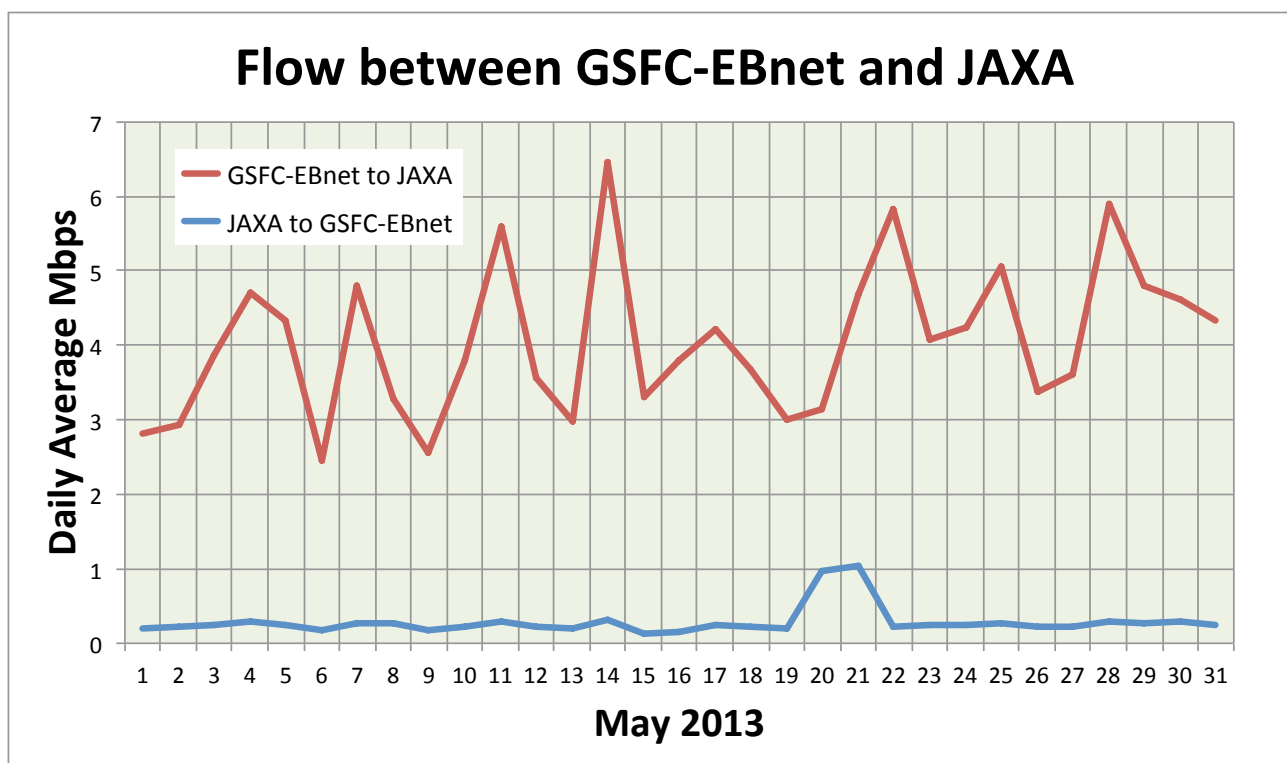
Note that thruput from GSFC to the Tokyo Exchange Point is well in excess of the JAXA requirements.